

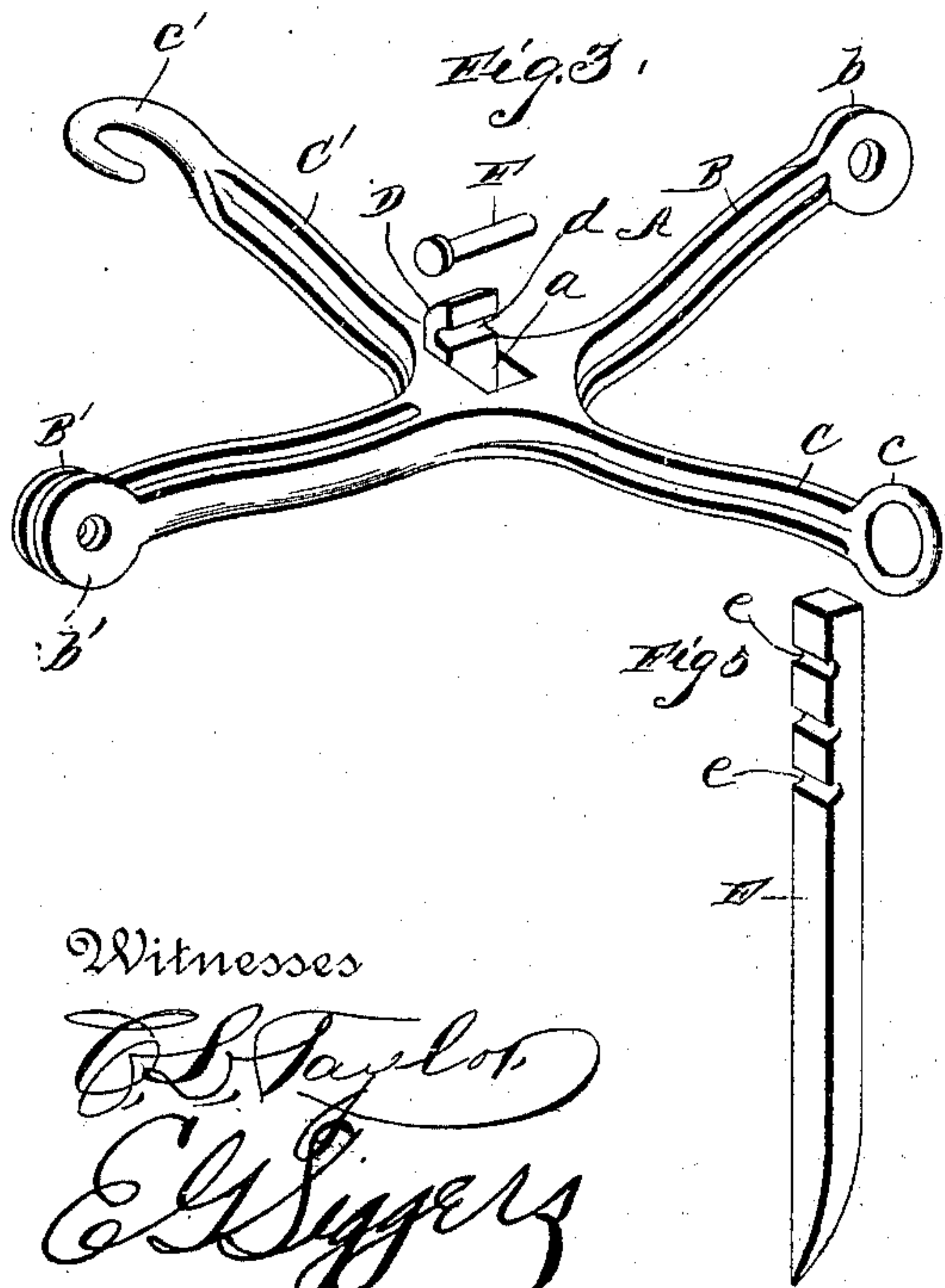
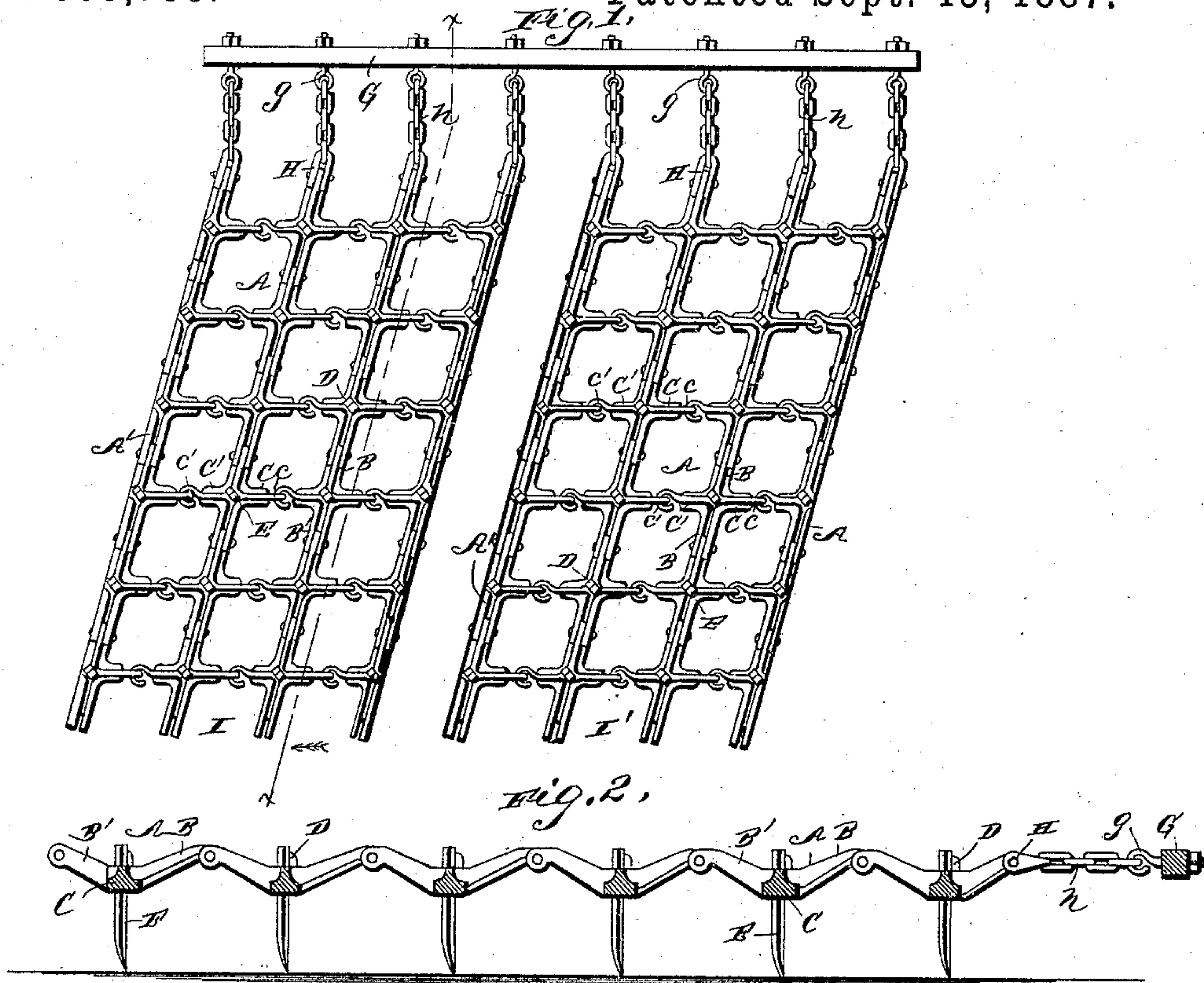
(No Model.)

G. M. POWELL.

HARROW.

No. 369,735.

Patented Sept. 13, 1887.



Witnesses

C. B. Taylor
E. J. Sayers

Inventor

Geo. M. Powell

By his Attorneys

C. A. Howard

UNITED STATES PATENT OFFICE.

GEORGE M. POWELL, OF GENEVA, DAKOTA TERRITORY.

HARROW.

SPECIFICATION forming part of Letters Patent No. 369,735, dated September 13, 1887.

Application filed June 21, 1887. Serial No. 242,031. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. POWELL, a citizen of the United States, residing at Geneva, in the county of Roberts, Dakota Territory, have invented new and useful Improvements in Harrows, of which the following is a specification.

My invention relates to improvements in harrows; and it consists in a certain novel construction and arrangement of parts, fully set forth hereinafter, and specifically pointed out in the appended claims.

In the drawings hereto annexed, Figure 1 is a plan view of a harrow embodying my improvements. Fig. 2 is a section view of the same on the line *x x* of Fig. 1. Fig. 3 is a detail perspective view of one of the tooth-carrying sections. Fig. 4 is a detail central section of the same. Fig. 5 is a detail view of one of the cultivating-teeth.

Referring by letter to the drawings, A designates one of the detachable sections of my improved harrow, comprising the arms B B', opposite and aligned with each other, and the arms C C', opposite and aligned with each other and disposed at almost a right angle to the said arms B B'. The arm B is provided on the end with an eye, *b*, the opening in which is horizontal, and the arm B' is provided on the end with a double eye, *b'*, comprising two single eyes placed side by side and parallel with each other, with the aligned openings therein arranged horizontal. The arms C C' are provided, respectively, with a vertical eye or ring, *c*, and a horizontal hook, *c'*.

A square or diamond-shaped vertical aperture, *a*, is formed in the center of the section A, and on the upper side of the said section is formed a vertical lug or standard, D, with one side thereof flush with one of the sides of the said aperture *a*, and in the said side is formed a horizontal groove, *d*, for a purpose to be hereinafter explained.

E designates the tooth or spike, which is either square or diamond-shaped in section, and is adapted to fit in the vertical aperture in the section A. The said tooth is provided on one side with a series of horizontal grooves, *e*, similar to and adapted to align with the groove in the lug or standard D, and when one of the said grooves *e* is aligned with the

groove *d* the pin F is passed through the same, thus securing the tooth in place in the section. It will be seen that by aligning different grooves on the tooth with the groove on the lug D any desired vertical adjustment of the said tooth may be had.

I do not desire to confine myself to the particular mode of adjustment of the teeth in the section as herein described, as there are many ways in which the same may be accomplished without departing from the spirit of the invention herein set forth.

The lower end of the tooth is sharpened in a peculiar manner—namely, two of the sides of the tooth are carried straight down to the lower end thereof, and the other two sides are beveled to form a point. Thus the beveling is one-sided and the point of the tooth is on one of the angles thereof. The tooth is disposed in the section with the side on which the point is formed to the front and the beveled side to the rear.

The sections are connected to form a harrow as follows: The single eyes are passed between the members of the double eyes, and pins are passed through the aligned openings and secured in place by keys passed through the ends thereof. The hooks on the side arms of the sections are engaged in the eyes in the adjacent sections. Thus it will be seen that the joints between the sections and those on each side thereof are universal joints, while the joints between the sections and those in front and rear are hinge or pivot joints, only allowing of vertical oscillation.

G designates a draft-beam extended across the front end of the harrow and provided with a series of eyebolts, *g g*. Clevises H H are bolted to the single eyes on the front row of sections, and between the said clevises and the eyebolts *g g* are arranged short chains *h h*, to form a flexible connection between the body of the harrow and the draft-beam. The draft-beam may be arranged at the other end of the harrow; but in that case the clevises are omitted, and a bolt or pin is passed through the double eye (which will then be on the front sides of the sections) and the end link of each of the short chains *h h*.

The advantage to be gained by arranging the draft-beam at the opposite end of the har-

row is that the cultivating-teeth are then arranged with the beveled sides of the point to the front. This is desirable in soft loamy soil, where, if the other side of the teeth was to the front, they would penetrate into the ground more than is necessary. The teeth are used with the straight sides to the front in hard and stony soil, where the beveled sides of the teeth would not take any hold whatever.

The sections may either be arranged in divisions I I', as shown in the accompanying drawings, or in a single body, as is the usual manner of disposing them in the ordinary harrows, and it will be observed that the outer arms are dispensed with on the sections at the sides of the harrow and at the sides of the divisions, thus forming three armed sections, A' A'.

The advantage gained by forming the harrow in sections, as described, is that in plowing or cultivating rough or hilly soil the teeth of the harrow will follow the irregularities of the surface. For instance, the teeth will pass down into a hole or hollow and cultivate the bottom thereof, and in passing over a ridge the joints of the sections will yield, and thus allow the harrow to double over the top thereof. Thus every part of the surface of the ground passed over is cultivated, whereas when rigid harrow-frames are used the depressions and the surfaces on each side of a ridge or elevation are not touched.

A further advantage of my improved harrow-frame is that in case the lower end of one of the teeth should strike against a heavy stone, a root, or other unyielding obstruction, the said tooth will be inclined rearwardly (the joints between the sections yielding) and will slip over the said obstruction. When the stone or root is passed the section and tooth will resume their normal positions. It will be understood that the said yielding of the sections of the harrow does not take place when an ordinary impediment is touched, but only when the tooth strikes against an unusually firm and stubborn substance. By forming the harrow as described, whereby when one of the teeth thereof strikes against an impediment, of sufficient weight to prevent its removal, it will yield, the draft-animals are saved from a great amount of unnecessary straining, and there is less liability of the parts of the harrow being injured or broken. In harrows having rigid teeth, when one of the same strikes against an unyielding obstruction, either the animals are stopped with a jerk, the harrow is strained, or the said tooth is broken or bent so as to be useless.

A further advantage of my improved frame is that any number of tooth-carrying sections may be employed to suit the number of draft-animals to be used or to suit the character of the soil to be cultivated.

The harrow is designed to be made of malleable iron, and the construction thereof is very simple and strong, and, as the parts are detachable, the teeth adjustable vertically, and the entire frame reversible to reverse the teeth, the device will be found very well adapted for its purposes.

Having thus described the construction, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The herein-described harrow, composed of a series of sections having the arms B B' opposite each other, provided, respectively, with the single eye *b* and the double eye *b'*, and the arms C C', opposite each other, provided, respectively, with the vertical eye *c* and the horizontal hook *c'*, the said single eye *b* being placed between and aligned with the double eye on the section in front, and the hook *c'* being engaged in the eye *c* adjacent thereto on the side, and the teeth E secured in the centers of the said sections, substantially as specified.

2. In a harrow composed of sections flexibly joined together, the section A, having the central aperture, *a*, radial arms B B' C C', lug D, having one side thereof flush with the side of the said aperture and provided with grooves *d* therein, tooth E in the said aperture *a*, having a series of grooves, *e*, in the side thereof, and pin F, passed through the aligned grooves in the said lug and tooth, substantially as and for the purpose set forth.

3. In a harrow, the combination of the sections flexibly jointed together and having a central aperture, and the radial arms B and C, provided on the extremities with eyes, the clevises secured to the forwardly-extending arms, the draft-beam G, the series of eyebolts *g* therein, the chains *h*, connecting the clevises to the eyebolts, and the cultivating-teeth adjustably secured in the central apertures and beveled on one side, the said draft-beam being adapted to be secured to either side of the harrow, as and for the purpose specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

GEORGE M. POWELL.

Witnesses:

FRANK A. ELDREDGE,
CHAS. W. SCHNEIDER.